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year and spent three months trawling and dredging on the coast of Japan. In June she sailed for Alaska on commercial investigations of the Alaska salmon fisheries.

The statistical canvasses have this year covered New England, New York and Lake Erie, and in May the canvass of the Pacific coast was begun. The figures for New England show a moderate falling off in value of fishery products since the last tabulation in 1889, and also in the amount of invested capital, the latter caused by the transfer of the menhaden industry to New York. The lobster fishery has the remarkable record of a diminution, since 1889, of over 50 per cent. in quantity and a coincident increase of over 50 per cent. in value. The total value of New England fisheries reaches over nine and one-half millions. Lake Erie and Lake Ontario come forward with a large increase in quantity and value, the whitefish, a species very extensively propagated by the Commission, sharing largely in this expansion. Over three and one-half million pounds of the much-abused carp were taken from the American waters of the lake in 1899, with a value of over $50,000. Indeed, a glance at the figures for this species shows that the carp is certainly the most valuable fresh-water fish after the whitefish and its allies, the pike perch and the lake trout, and should afford food for thought to those who condemn the carp as an unmitigated evil. The Illinois Fisherman's Association reports the catch in the Illinois river as greater in quantity than that of all other species combined, with a value of nearly $200,000. Carp have increased many fold in the Middle Atlantic States and the Middle West during the last decade, the quantity taken in Lake Erie, the Illinois river, and the Ohio river and its tributaries, during 1899, being nine times that of six years ago.

The annual visit to the fur-seal rookeries on the Pribilofs shows the continued decline of the seal herd as a consequence of the continuance of pelagic sealing. The number of seals taken from the islands under government supervision was 16,812, and the pelagic catch from the American herd some 34,000.

M. C. MARSH.

A Handbook of Photography in Colors. By THOMAS BOLAS, ALEXANDER H. K. TALLENT and EDGAR SENIOR. Published by Marion and Co., London. American edition by E. & H. T. Anthony, New York and Chicago.

The authors of this book have brought together in compact form the very scattered literature pertaining to color photography. Part I., by Mr. Bolas, contains a brief history of helichromy, from the early work of Seebeck, Herschel and others until the present day, covering about the same ground as the new edition of Zenker's 'Lehrbuch der Photochromie.' His account of Wiener's work and suggestions regarding the possibility of getting a truly chromo-sensitive surface will be found of use by any who are engaged in the hitherto fruitless search of a substance which when exposed to colored light will assume permanently the color of the illuminating light. That such a surface is theoretically possible is clearly shown, and methods of realizing it in a crude way are given.

The general principles of the various processes are given, including those of Joly, Ives, Lippmann and others. Lippmann's account of his interference process as delivered in English before the Royal Photographic Society is given verbatim. His picture of the formation of the thin laminæ which produce the colors by the stationary light waves is interesting. It will be remembered that these stationary waves are produced by backing the sensitive film with mercury. "If you put no mercury," says Lippmann, "each train of waves rushes through the plate and wipes off every record of its own form by reason of its velocity; you cannot expect a thing which moves with a velocity of 300,000 kilometers a second to give a photograph of itself. If you put a mercury mirror behind the plate, then the following phenomena occur: the light is reflected back on itself; the light rushes in with the velocity of light, and rushes out with the same velocity; the entering and issuing waves interfere, and the effect of interference is that vibration takes place, but the effects of propagation are stopped, and instead of having propagated waves, we get stationary waves; that is, the waves

now rise and fall each in its own place; they pose, therefore, in the film and impress their form upon it, the largest movement giving the largest impression, and where the movement is naught the impression is naught."

Part II., by Mr. Tallent, is devoted to three-color photography. It opens with an elementary treatment of spectrum work as applied to the study of color and color mixtures. Following this comes a very complete account of color curves, and the reproduction of various colors by the synthesis of three primary spectrum colors. Ives's beautiful method is again described, together with fuller details regarding the preparation of color records, the preparation and use of color filters and other details. The various other modifications of the three-color scheme are treated, closing with a chapter on Wood's diffraction process. It seems a pity that fuller working details of some of the methods of producing colored transparencies by the superposition of dyed films, are not given. However, there are hints enough to enable one to experiment along these lines if so inclined.

Part III., by Mr. Senior, is a dozen or so pages on the Lippmann process, with formulæ for the preparation of the emulsion. There is a good deal of repetition in the book, as is usually the case in symposia of this sort. It will, however, be found very useful as a reference book by those desirous of experimenting with any of the processes.

R. W. W.

BOOKS RECEIVED.

Lectures on the Lunar Theory. JOHN COUCH ADAMS. Edited by R. A. SAMPSON. New York, The Macmillan Company; London, Cambridge, University Press. 1900. Pp. 88. $1.25.

Knowledge, Belief and Certitude. FREDERICK STORRS TURNER. New York, The Macmillan Company; London, Swan, Sonnenschein & Company. 1900. Pp. viii+484. $2.25.

Engineering Chemistry. THOMAS B. STILLMAN. Easton, Pa., The Chemical Publishing Company. 1900. Vol. II., pp. xxii+503. $4.50.

Elementary Organic Analysis. FRANCIS GANO BENEDICT. Easton, Pa., The Chemical Publishing Company. 1900. Pp. vi+86. $1.00.

A Text-book of Urine Analysis. JOHN H. LONG. Easton, Pa., The Chemical Publishing Company. 1900. Pp. iv+249. $1.50.

Evolution of the Thermometer. HENRY CARRINGTON BOLTON. Easton, Pa., The Chemical Publishing Company. 1900. Pp. 98. $1.00.

The Chemists' Pocket Manual. RICHARD K. MEADE. Easton, Pa., The Chemical Publishing Company. 1900. Pp. vii+204. $2.00.

Handbook of Practical Hygiene. D. H. BERGEY. Easton, Pa., The Chemical Publishing Company. 1899. Pp. 164. $1.50.

Concretions from the Champlain Clays of the Connecticut Valley. J. M. ARMS SHELDON. Boston. 1900. Pp. 45. Plate xiv.

Annual Report of the State Geologist of New Jersey for the Year 1899: Forests. Trenton, N. J., MacCrellish & Quigley. 1900. Pp. xvi+327.

Nature's Miracles: Electricity and Magnetism. ELISHA GRAY. New York, Fords, Howard & Hulbert. 1900. Pp. vi+248. $.60.

SCIENTIFIC JOURNALS AND ARTICLES.

THE January *American Journal of Physiology*, the concluding number of Vol. IV., records in the initial paper further interesting results obtained by Loeb in his study of artificial parthenogenesis. Loeb has caused the eggs of Chætopterus, an annelid, to develop into free swimming larvæ by simply placing the eggs in various solutions which cause them to lose water. Potassium ions, however, have peculiar power over these eggs which grow to the trochophore stage in a KCl solution with an osmotic pressure considerably lower than that of sea water. A slight addition of HCl to the sea water also causes the eggs to develop. Loeb carefully observed the morphological changes in the eggs during their development, and found that although the artificially produced trochophores may be indistinguishable from those arising from fertilized eggs, yet the processes of segmentation varied so greatly that these processes must be regarded as distinctly a function of the constitution of the sea water. These observations, together with those on the formation of giant embryos by the fusion of two or more eggs, have an important bearing on developmental mechanics and cell lineage. Loeb concludes with a consideration of the relation